

REMARKS

After entry of the above amendments, the claims pending in the present application are 1-2, 7-8, and 11-21. Applicants respectfully request reconsideration of the present application in view of the amendments and Remarks herein.

SPECIFICATION

The disclosure has been objected to because the chemical structures on pages 4-5 and 8-9 are alleged to be incomplete. The Specification has been amended to clarify these chemical structures, and Applicants respectfully request withdrawal of this objection.

CLAIM AMENDMENTS

Claim 1 has been amended to include the term “and” before the recitation describing formula B. This merely clarifies that each of the units of formulas A, B and C are required components of the claimed cement additive, as described in Paragraph (0022) of the present specification. Claim 1 has also been amended to incorporate the subject matter of original claim 6, support for which can be found in original claim 6 as well as in the Specification at Paragraph (0015).

Claim 2 has been amended to include the term “weight” prior to the phrase “average molecular weight.”

Claims 3-6 and 9-10 have been cancelled, without prejudice, in light of the addition of the subject matter of original claim 6 into new claim 1.

Claim 8 has been amended to remove the redundant recitation “polycarboxylic acid type” before “copolymer comprising vinyl alcohol”.

New Claim 21 directed to specific embodiments has been added, finding support in the Specification at Page 13, Paragraph 0035.

35 U.S.C. § 112 REJECTIONS

It is alleged in the Office Action that claim 1 is indefinite because an “and” should be added after the last line of the recitation describing formula A “to be consistent with the Markush format.” Claim 1 has been amended to include the term “and” as requested, but Applicants respectfully submit that formulas A, B and C are not alternatively recited in the claimed cement additive, as would be indicated by the use of a Markush format, but rather at least one of each of the three A, B, and C type constituent units are required components of the cement additive, as described in Paragraph (0022) of the present Specification.

MPEP § 2173.05(h) states that a Markush group “recites members as being ‘selected from the group consisting of A, B and C.’ See *Ex parte Markush*, 1925 C.D. 126 (Commr Pat. 1925).” See MPEP at 2100-227. Claim 1, as amended, recites “[a] cement additive containing copolymers comprising one or more constitutional units represented by formula A . . . ; and one or more constitutional units represented by formula B . . . ; and one or more constitutional units represented by formula C” The language of amended Claim 1 is not intended to be in the form of a Markush group consisting of formula A, formula B, and formula C. In view of the amendment and remarks, Applicant respectfully requests that this rejection of Claim 1 be withdrawn.

Claim 2 has been rejected because the recited “average molecular weight” is alleged to be indefinite. Claim 2 has been amended to recite “weight average molecular weight.” Applicants respectfully submit that it is well known to those having ordinary skill in the art that the molecular weight of a molecule or compound is calculated as “weight average molecular weight,” unless there is an express teaching of another basis for the calculation of the molecular weight. As amended, Claim 2 is no longer indefinite, and Applicant respectfully requests that this rejection be withdrawn.

Claim 8 has been rejected because the recited “polycarboxylic acid type copolymer comprising vinyl alcohol” is alleged to be indefinite. Claim 8 has been amended to remove the language “polycarboxylic acid type” prior to “copolymer comprising vinyl alcohol,” as the removed language is redundant. As amended, claim 8 is no longer indefinite, and Applicant respectfully requests that this rejection be withdrawn.

35 U.S.C. § 103 REJECTIONS

Claims 1-20 have been rejected as being unpatentable over Albrecht, et al. (U.S. Patent Nos. 5,798,425 or 6,777,517 B1) or WO 01/58579 in view of Yamashita, et al. (U.S. Patent No. 6,911,494 B2) or Yaguchi, et al. (U.S. Patent No. 6,762,220 B1).

Claim 1 has been amended to include the subject matter of original claim 6. As amended, claim 1 discloses a cement additive containing copolymers comprising one or more constitutional units represented by formula A, and one or more constitutional units represented by formula B, and one or more constitutional units represented by formula C, wherein the cement additive comprises copolymers wherein the mole ratio of the constitutional units A and C is $0.1 \leq A/C \leq 1$ and the mole ratio of the constitutional units B and C is $B/C \leq 1$, and (also) copolymers wherein the mole ratio of the constitutional units A and C is $A/C > 1$ and the mole ratio of the constitutional units B and C is $1 < B/C \leq 20$.

The first of these copolymers have characteristic slump retention properties, and the second of these copolymers have characteristic dispersing properties, as described in Paragraphs (0014)-(0015) of the present Specification. As stated in Paragraph (0020) of the present specification, the present cement additive,

based on the copolymer structure, the elements constituting said copolymers and the intramolecular ratios of the constitutional elements as well as on the mixing ratios of the specific copolymers by which these properties can be achieved, provides excellent working properties, dispersion properties and slump maintaining properties and achieves excellent working properties and workability for a wide range of concrete manufacturing conditions.

As shown in Table 4 of the present Specification, the claimed cement additive provides superior performance as compared to conventional additives. When mixed into concrete, the examples which utilized various cement additives as presently claimed, exhibited superior performance as compared to Comparative Example 1, in which the copolymers lacked constituent units of formula C, and as compared to Comparative Examples 2 and 3, which utilized a conventional polycarboxylic acid ether high performance AE water-reducing agent.

The present claims, therefore, define a cement additive containing at least two copolymers, each copolymer having at least one type of three different formulae constituent units, the copolymers having different mole ratios between the three constituent unit types, the combination of which advantageously provides both slump maintenance and dispersing effects.

Even within the two disparate copolymers as claimed, constitutional unit A is used to incorporate an alkylene oxide chain or a similar structure into the copolymer structure, and mainly has an influence on dispersion properties (Paragraph 30). Constitutional unit B having a suitable structure and incorporated at a specific amount into the copolymer, provides excellent slump maintaining properties (Paragraph 32).

Constitutional unit C has the role of maintaining the cement composition in a good state. This constitutional unit, which plays a very important role for achieving excellent workability, keeps the cement and the aggregates well blended and maintains an appropriate degree of viscosity and flow properties even if the water/cement ratio in the cement composition and the temperature change and time passes (Paragraph 33).

The Albrecht '425 and '517 patents and WO 01/58579 in view of Yamashita, et al. or Yaguchi, et al. do not alone or in combination disclose or suggest such a cement additive, nor do they teach or suggest results similar to those obtained by use of the claimed cement additive.

None of the cited documents disclose or suggest that copolymer mixtures as claimed are used as a cement admixture, and particularly no copolymer mixtures with the claimed molar ratios of A, B and C.

Contrary to the allegations of the Office Action, none of the cited documents suggest that copolymers with the respective proportions of A, B and C would be comprised in the recited proportions. For example, in Albrecht '425 and '517, it is only disclosed that up to 50 mol % of structural element C could be added. Nothing is taught or suggested in these two references with respect to the molar ratios of the A, B and C constitutional units recited in amended claim 1.

With respect to WO 01/58579 A1, constituent unit A is not disclosed, as this reference does not teach or suggest the incorporation of vinyl ethers into the copolymer.

The Office Action states that it "would have been obvious to one having ordinary skills in the art to formulate the copolymer additive as taught, motivated by reasonable expectation of success". As discussed above, the copolymers having the specific ratios of constituent units have not been disclosed in the references. Nor are there suggestions in the references as to the specific copolymers to use, or that it could be advantageous to combine such copolymers in a formulation to solve the problems of good dispersion, maintaining of slump and good workability. The person skilled in the art would not be motivated to attempt the claimed combinations of units and copolymers in the claimed proportions without reference to the subject Specification, disclosing the mixtures of copolymers and specifying the ratios of A, B and C as claimed that have an effect as dispersion agent, slump retainer and at the same time keeping the cement composition in a good state of workability.

The Office Action alleges that the cement additive species of claims 8, 12, and 14-16 are conventionally included in cement compositions, as taught in the '494 and '220 patents, and one having skill in the art would have readily envisaged their inclusion, thus rendering these claims obvious. However, as MPEP §2143.03 states, "[i]f an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d

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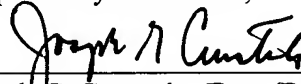
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1071, 5 USPQ2d 1596 (Fed. Cir. 1988).” See MPEP at §2100-142. It is noted that claims 8, 12 and 14-16 all depend, either directly or indirectly, from claim 1.

Therefore, in view of the amendments and remarks above, Applicants respectfully request withdrawal of the 35 U.S.C. §103 rejection with respect to claims 1-2, 7-8, and 11-21.

In view of the amendments and remarks contained above, Applicants respectfully request reconsideration of the application, withdrawal of the specification rejection and the 35 USC §103 and §112 rejections, and request that a Formal Notice of Allowance be issued for claims 1-2, 7-8, and 11-21. Should the Examiner have any questions about the above remarks, the undersigned attorney would welcome a telephone call.

Respectfully submitted,



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